

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 3302**

Roll No.

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**B.Tech.****(SEMESTER-II) THEORY EXAMINATION, 2011-12****ELECTRONICS ENGINEERING****Time : 3 Hours ]****[ Total Marks : 100****Note : Answer all the Sections.****Section – A****1. Attempt all parts of this question :****10 × 2 = 20**

- (a) Distinguish between avalanche and zener breakdown.
- (b) For p type semiconductor dopants from 3<sup>rd</sup> group are typically employed. Can we use dopants from 2<sup>nd</sup> group ? Give reason.
- (c) Determine  $I_E$ ,  $\alpha$  and  $\beta$  of common base transistor circuit given  $I_C = 7 \text{ mA}$ ,  $I_B = 0.1 \text{ mA}$ .
- (d) The thickness of base is typically smaller than emitter and base. Why ?
- (e) What is the basic difference between JFET and MOSFET ?
- (f) What do you mean by term slew rate in opamp ?
- (g) Convert  $120_{10}$  to equivalent hexadecimal.
- (h) What do you mean by canonical form of a Boolean expression ?
- (i) How is voltage measured using CRO ?
- (j) Describe input characteristics of a digital voltmeter.

## Section – B

2. Attempt any **three** parts of this question :

$3 \times 10 = 30$

- (a) (i) Explain the formation of potential barrier across a p-n junction.  
 (ii) Explain the function of the circuit of Fig. 1 and draw the output waveform.

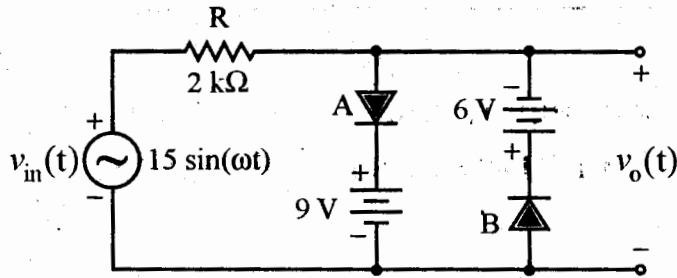


Fig. 1

- (b) (i) What is base width modulation ? How it affects the output characteristics of a transistor in CB and CE configuration ?  
 (ii) The transistor in Fig. 2 has values of  $h_{FE} = 100$ . Determine the Q-point values of  $I_C$  and  $V_{CE}$  at both of these temperatures,

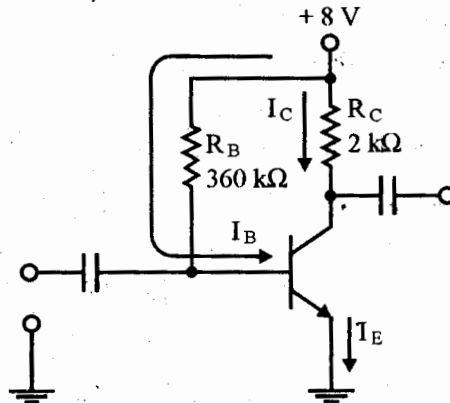


Fig. 2

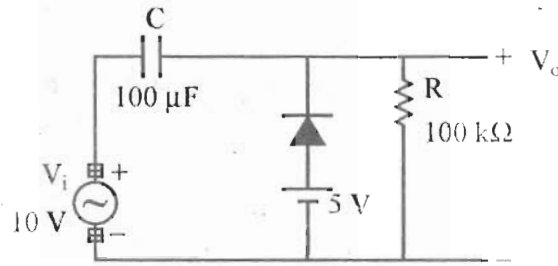
- (c) (i) Describe different biasing schemes used in JFET amplifiers. State their advantages.  
 (ii) Given  $I_{DSS} = 9 \text{ mA}$  and  $V_p = -3.5 \text{ V}$ , determine  $I_D$  when  $V_{GS} = 0 \text{ V}$  and  $V_{GS} = -2 \text{ V}$ .  
 (d) (i) Represent the unsigned numbers 84 and 56 in BCD and then show the steps necessary to form their sum.  
 (ii) Express  $(10110.0101)_2$  in decimal.  
 (e) (i) Explain how would you measure phase of signal from CRO.  
 (ii) Describe the operating of CRO with neat block diagram.

### Section – C

Attempt any **two** parts of each question :

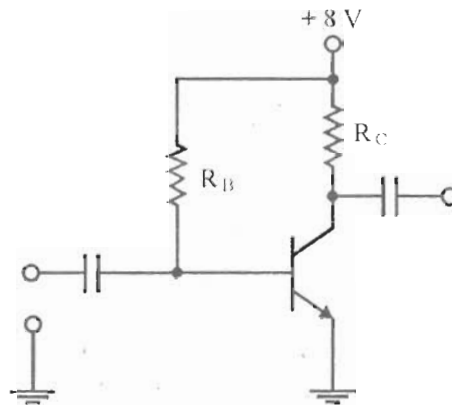
$5 \times 10 = 50$

3. (a) Determine  $V_o$  for the network for the input indicated.



**Fig. 3**

- (b) Explain the working of centre tap full wave rectifier. What is the value of peak inverse voltage ?
- (c) Discuss the application of zener diode as shunt regulator.
4. (a) Draw hybrid equivalent of CE configuration and obtain expressions for  $A_i$  and  $A_v$ .
- (b) Why is transistor biasing required ? Describe different schemes of transistor biasing in CE n-p-n transistor circuit. State their advantages.
- (c) Determine  $R_i$  and  $R_o$  for the circuit of Fig. 4. Use the following parameters :  $h_{fe} = 110$ ,  $h_{ie} = 1.6 \text{ k}\Omega$ ,  $h_{re} = 0.0002$  and  $h_{oc} = .20 \text{ }\mu\text{A/V}$ ,  $R_C = 4.7 \text{ k}\Omega$ ,  $R_B = 470 \text{ k}\Omega$ .



**Fig. 4**

5. (a) Explain the construction of depletion type NMOSFET and explain its output characteristics.
- (b) Draw the circuit diagram of an integrator using opamp and explain its working.
- (c) Describe ideal and practical opamp parameters.

6. (a) Implement an OR gate using NAND gates.
- (b) Simplify the following function with help of K map :
- $$F(A, B, C, D) = \Sigma(3, 5, 9, 11, 15) + d(2, 4, 6, 10)$$
- (c) Discuss the commutative and distributive postulates of Boolean algebra with example.
7. (a) Draw block diagram of digital multimeter and explain its working.
- (b) Discuss different controls of CRO.
- (c) What is function of time base circuit in CRO ? How will you measure the frequency of sinusoidal signal with help of CRO ?
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